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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/567,438	02/07/2006	Ernest Grimberg	31322	5035

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EXAMINER	
GREEN, YARA B	
ART UNIT	**PAPER NUMBER**
2884	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/567,438	Applicant(s) GRIMBERG, ERNEST	
	Examiner YARA B. GREEN	Art Unit 2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 December 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *62-64,66-72,74,76-81 and 84* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *62-64,66-72,74,76-81,84* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/11/2011,1/17/2011,2/10/2011*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 30, 2010 has been entered.

Response to Amendment

2. This Office Action is in response to Applicant's Amendment filed December 30, 2010 Claims 62, 74, and 79 have been amended. No claims have been added. Claims 1-61, 65, 73, 75, and 82-83 have been previously canceled. Currently, claims 62-64, 66-72, 74, 76-81, and 84 are pending.

Response to Arguments

3. Applicant's arguments filed have been fully considered but they are not persuasive.

4. With regards to Applicant's arguments that Tsuchimoto (US 5,944,701) fails to disclose a reference temperature of the shutter (page 9, para. 2-4), the Examiner politely disagrees. First, Tsuchimoto explicitly disclose measuring the temperature of the sensor (col. 8, lines 38-45). Second, measuring the energy of an object is a direct function of temperature and is the means by which temperature is measured (since a given photon has a particular frequency which is directly proportional to its energy, and a sensor is sensitive to energy deposited by the photon).

5. With regards to Applicant's arguments that Tsuchimoto only uses a single sensor instead of a sensor array (page 10, para. 2), the Examiner politely disagrees. Tsuchimoto explicitly discloses the sensor to comprises a two dimensional array (col. 7, lines 32-36).

6. With regards to Applicant's arguments that Tsuchimoto fails to teach averaging the video signal, the Examiner politely disagrees. As discussed below, Tsuchimoto subtracts a quantity Q representative of the radiation within the camera indicative of reference level of the output signal for which there needs correction (col. 7, lines 55-65; col. 8, lines 15-60). This level necessarily requires an average signal in order to accurately represent the offset of the array. Alternatively, the teachings of Marshall et al. (US 6,515,285) disclose averaging a signal of the sensor array in order to obtain an offset not due to an external scene.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. **Claims 62-64, 66-69, 71-72, 74, 76-80**, and **84** are rejected under 35 U.S.C. 103(a) as being unpatentable over Butler (US 2002/0074499; published June 20, 2002) and Tsuchimoto et al. (US 5,994,701; published November 30, 1999) and Marshall et al. (US 6,515,285; filed February 11, 2000).

Re **claims 62** and **74,** Butler discloses an infrared imaging camera comprising (para. 0005, 0010):

an uncooled and unshielded detector comprising an array of infrared sensor arranged to detect infrared radiated energy (para. 0028, 0031),

a non-uniformity corrector, associated with said detector, operable to perform non-uniformity correction on output of said arrays to provide uniform outputs having a uniform response to energy detected at said uncooled sensor (para. 0028-0029).

As Applicant correctly notes, Butler does not teach a separate function with the calibrator that corrects the object temperature further by incorporating a temperature measurement by a sensor on the shutter and imaging the shutter. Instead, Butler uses the shutter information to correct non-uniformities amongst the detector elements.

Butler further teaches where such calibration involves a reference for deriving a reference temperature indicative of radiated energy not from an external scene and for approximating a temporal drift of local temperature and correcting the signal representative of the temperature of objects in the radiometer's field of view (para. 0057-0063).

In a similar field of endeavour, Tsuchimoto et al. disclose a calibrating an infrared detector array by implementing a calibrator to carry out periodic calibrations (col. 9, lines 15-25) of a temperature of a shutter of said camera while said shutter is closed, using a first temperature located on said shutter (col. 7, lines 30-35) and to derive from said at least one calibration temperature measurement a reference temperature indicated of radiated energy not from an external scene (col. 8, lines 7-60) and a reference level comprising a reference level comprising the signal of the said IR sensors at the time of said calibration measurement (col. 9, lines 20-30), and to calculate a temperature of objects in said camera's field as a function of said calibration measurements where the reference temperature serves as an offset (col. 9, lines 50-55).

Tsuchimoto et al., however, do not explicitly disclose implementing an average video signal of the sensor array. Tsuchimoto et al. disclose the sensor measuring the radiation that does not come from the scene or the shutter in order to correct for output signals (col. 9, lines 20-30). The radiation measurements are disclosed generally as an output Q that used in the offset corrections (col. 7, lines 55-65; col. 8, lines 15-60). Since this output represents the entire sensor array and represents the temperature of the internal camera parts (as in the Instant Application), the skilled artisan would consider such an output to represent the average output of the sensor. Alternative mathematical operations of the pixel outputs (subtraction, addition, etc) would not accurately represent the sensor output relating to radiation not from the scene.

Alternatively, in a similar field of endeavour, Marshall et al. disclose calculating an offset to be used in calibration to account for temperatures within the camera by averaging the signals of the detector array (col. 14, lines 58-64). The skilled artisan would have been motivated to implement averaging the video signals of Marshall et al. in the method Tsuchimoto et al. in order to provide the reference level of the camera that accounts for the interior of the camera.

In *KSR*, the court held that application of a known technique to a piece of prior art ready for improvement yields obvious predictable results. *KSR Int'l. Co. v. Teleflex* 82 USPQ2d 1385, 1396 (US 2007). The skilled artisan would look to the teachings of Tsuchimoto et al. in the apparatus of Butler in order to further correct errors in temperature measurements by the infrared detectors of an external scene. The application of the Tsuchimoto et al.'s calibration is a known technique that is recognized as part of the ordinary capabilities of one skilled in the art so that both non-uniformity corrections as well as ambient temperature/sensor measurements may be used to calculate the actual temperature of an external scene. Butler further discloses using a same signal function for each of said sensors (para. 0057, 0068, 0026-0027).

Re **claims 63, 64,** and **76**, Butler, as modified by Tsuchimoto et al. and Marshall et al., disclose the limitations of claim 62 and 74, as mentioned above. Tsuchimoto et al. further disclose combining a value from the initial calibration temperature measurement with a second value taken from a second calibration temperature measurement, said combining using a time-dependent function, to produce interpolations of said reference temperature from recent calibration measurements (col. 10, lines 10-55). While Tsuchimoto et al. do not disclose the camera to be configured to do extrapolations, the process of extrapolating recited is a functional recitation of the apparatus. Tsuchimoto et al. discloses the structural limitations and is considered to be capable of the similar mathematical function of extrapolating data since extrapolation is held to be similar to interpolation in which only the range of either time or temperature is expanded. *Hewlett-Packard Co. v. Bausch & Lomb, Inc.* held that apparatus claims "cover what a device is, not what a device does." 909 F.2d 1464, 1469. The burden shifts to the Applicant to come forward with evidence establishing an unobvious difference between the claimed and the prior art product. *In re Marosi,* 710 F.2d 798.

Re **claim 66**, Butler, as modified Tsuchimoto et al. and Marshall et al., disclose the limitations of claim 62, as mentioned above. Butler further discloses wherein the calibrator is further configured to measure a respective second reference temperature during an external temperature measurement using s second sensor located on a housing of said camera, wherein said respective second reference temperature is a further parameter of said signal to temperature function for said external temperature measurement (para. 0026-0027, 0035).

Re **claims 67** and **72**, Butler, as modified Tsuchimoto et al. and Marshall et al., disclose the limitations of claim 62, as mentioned above. Butler discloses wherein the calibration measurements are made at intervals less than the thermal time constant of the camera (para. 0055, 0056). It follows

that repeated measurements during the changing temperature of the camera falls within the thermal time constant of the camera.

Re **claim 68**, Butler, as modified by Tsuchimoto et al. and Marshall et al., disclose the limitations of claim 62, as mentioned above. Tsuchimoto et al. further disclose locating a sensor on the shutter to effectuate calibration based on shutter temperature (col. 8, lines 39-45) Furthermore, Butler teaches wherein a sensor is located external to the surface of the vacuum packaging and a sensor is located on a case surrounding the optics of the camera (para. 0027). Butler is silent with regards to the type of sensor used for temperature measurement, thereby allowing for that which is well known in the art. Tsuchimoto et al. teach thermistors to be suitable sensors for measuring the temperature of a desired area of an infrared camera (col. 2, lines 40-52). Therefore, it would have been obvious to one of ordinary skill in the art to implement thermistors as the sensors of Butler, as taught by Tsuchimoto et al., as they have been demonstrated to be acceptable temperature detectors and their locations provide adequate calibration.

Re **claim 69**, Butler, as modified by Tsuchimoto et al. and Marshall et al., teaches the limitations of claim 65 as mentioned above. Butler does teach, however, aiming the infrared camera at a blackbody whose temperature is known in order to correct for non-uniformities amongst the detector elements (para. 0096) but is silent with regards to origin of the blackbody. Butler also teaches employing a shutter (para. 0104). The blackbody of Butler inherently requires the emissivity to be substantially approaching one (see discussion of claim 65 above).

Re **claims 71** and **78** Butler, as modified by Tsuchimoto et al. and Marshall et al., teaches the limitations of claim 62 and 74, as mentioned above. Butler further discloses wherein the uncooled detector comprises a microbolometer array (para. 0028) where it follows that bolometers used in thermal cameras may include microbolometers.

Re **claim 77**, Butler, as modified by Tsuchimoto et al. and Marshall et al., teach the limitations of claim 74, as mentioned above. Butler further discloses wherein the IR sensor array is operable to provide a two-dimensional image (para. 0039-0040).

Re **claim 79,** Butler discloses a method for correcting a response to an unshielded radiometer in accordance with temperature measurement (para. 0028, 0031), said radiometer comprising an array of infrared sensor for providing an image in response to form a temperature image in accordance with IR radiation impinging on said IR sensor's field of view (para. 0028, 0039-0040), and a shutter, for controllably obscuring said FOV (para. 0104), the method comprising:

performing non-uniformity corrector, associated with said detector, operable to perform non-uniformity correction on output of said arrays to provide uniform outputs having a uniform response to energy detected at said uncooled sensor (para. 0028-0029).

As Applicant correctly notes, Butler does not teach a separate function with the calibrator that corrects the object temperature further by incorporating a temperature measurement by a sensor on the shutter and imaging the shutter. Instead, Butler uses the shutter information to correct non-uniformities amongst the detector elements.

In a similar field of endeavour, Tsuchimoto et al. disclose calibrating an infrared detector array by implementing a calibrator to carry out periodic calibrations (col. 9, lines 15-25) of a temperature of a shutter of said camera while said shutter is closed, using a first temperature located on said shutter (col. 7, lines 30-35) and to derive from said at least one calibration temperature measurement a reference temperature indicated of radiated energy not from an external scene (col. 8, lines 7-60) and a reference level comprising a reference level comprising an average video signal of the said IR sensors at the time of said calibration measurement (col. 9, lines 20-30), and to calculate

a temperature of objects in said camera's field as a function of said calibration measurements where the reference temperature serves as an offset (col. 9, lines 50-55).

Tsuchimoto et al., however, do not explicitly disclose implementing an average video signal of the sensor array. Tsuchimoto et al. disclose the sensor measuring the radiation that does not come from the scene or the shutter in order to correct for output signals (col. 9, lines 20-30). The radiation measurements are disclosed generally as an output Q that used in the offset corrections (col. 7, lines 55-65; col. 8, lines 15-60). Since this output represents the entire sensor array and represents the temperature of the internal camera parts (as in the Instant Application), the skilled artisan would consider such an output to represent the average output of the sensor. Alternative mathematical operations of the pixel outputs (subtraction, addition, etc) would not accurately represent the sensor output relating to radiation not from the scene.

Alternatively, in a similar field of endeavour, Marshall et al. disclose calculating an offset to be used in calibration to account for temperatures within the camera by averaging the signals of the detector array (col. 14, lines 58-64). The skilled artisan would have been motivated to implement averaging the video signals of Marshall et al. in the method Tsuchimoto et al. in order to provide the reference level of the camera that accounts for the interior of the camera.

In *KSR*, the court held that application of a known technique to a piece of prior art ready for improvement yields obvious predictable results. *KSR Int'l. Co. v. Teleflex* 82 USPQ2d 1385, 1396 (US 2007). The skilled artisan would look to the teachings of Tsuchimoto et al. in the apparatus of Butler in order to further correct errors in temperature measurements by the infrared detectors of an external scene. The application of the Tsuchimoto et al.'s calibration is a known technique that is recognized as part of the ordinary capabilities of one skilled in the art so that both non-uniformity corrections as well as ambient temperature/sensor measurements may be used to calculate the actual

temperature of an external scene. Butler further discloses using a same signal function for each of said sensors (para. 0057, 0068, 0026-0027).

Re **claim 80**, Butler, as modified by Tsuchimoto et al. and Marshall et al., disclose the limitations of claim 79, as mentioned above. Tsuchimoto et al. further disclose determining a time dependent response of said radiation sensor to said temperature of said shutter and using said time-dependent response in modifying said temperature calculations in between determinations of said reference temperatures (col. 10, lines 10-45).

Re **claim 84**, Butler, as modified Tsuchimoto et al. and Marshall et al., disclose the limitations of claim 62, as mentioned above. Butler further discloses measuring a respective second reference temperature during an external temperature measurement using s second sensor located on a housing of said camera, wherein said respective second reference temperature is a further parameter of said signal to temperature function for said external temperature measurement (para. 0026-0027, 0035).

9. **Claim 70** is rejected under 35 U.S.C. 103(a) as being unpatentable over Butler (US 2002/0074499; published June 20, 2002) in view of Tsuchimoto et al. (US 5,994,701; published November 30, 1999), and Marshall et al. (US 6,515,285; filed February 11, 2000), as applied to claim 62, and further in view of Everest (US Patent No. 4,907,895; published March 13, 1990).

Butler, as modified by Tsuchimoto et al. and Marshall et al., teach the limitations of claim 62, as mentioned above, but do not teach the shutter to be reflective. In a similar field of endeavour, Everest teaches coating at least part of the internal side of a shutter so that it highly reflective (i.e. has a reflectivity substantially approaching 1) to the infrared radiation generated by the sensor. This allows for the shutter to act as a mirror to the sensor so that it may be able to detect radiation

resulting from the detector and not from the field of view (col. 3, lines 13-18; col. 4, lines 52-67; col. 5, lines 10-15). It would have been obvious to one of ordinary skill in the art for the shutter to comprise a material that may reflect radiation indicative of the uncooled detector, as taught by Everest, in the apparatus of Butler, as modified by Tsuchimoto et al., in order to eliminate erroneous signals due to heating of the detector.

10. **Claim 81** is rejected under 35 U.S.C. 103(a) as being unpatentable over Butler (US 2002/0074499; published June 20, 2002) in view of Tsuchimoto et al. (US 5,994,701; published November 30, 1999), and Marshall et al. (US 6,515,285; filed February 11, 2000), as applied to claim 79, and further in view of Frey (US Patent No. 5,925,875; published July 20, 1999).

Butler, as modified by Tsuchimoto et al., teach the limitations of claim 79, as mentioned above but are silent with regards to filtering the image signal in order to compensate for modulated transfer function effects. In a similar field of endeavour, Frey teaches using a high pass filter in conjunction with a focal plane array in order to remove the unwanted temporal noise and fixed pattern noise components of an image signal (i.e. MTF effects) (col. 5, lines 50-61; col. 6, lines 45-65). One of ordinary skill in the art would have been motivated to implement the filtering of Frey in the method of Butler, as modified by Tsuchimoto et al., in order to remove noise components of an image.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to YARA B. GREEN whose telephone number is (571)270-3035. The examiner can normally be reached on Monday - Thursday, 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David P. Porta/
Supervisory Patent Examiner, Art Unit 2884

Yara B. Green
/YBG/